Evaluating the effectiveness of the Self-Administered Interview© for witnesses with autism spectrum disorder

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Abstract

The widely used evidence-based police interviewing technique, the Cognitive Interview, is not effective for witnesses with autism spectrum disorder (ASD). The present study examined whether a modification of the Cognitive Interview that removes the social element, the Self-Administered Interview© (SAI, Gabbert, Hope & Fisher, 2009), is more useful in facilitating recall by ASD witnesses. One of the main components of the Cognitive Interview is context reinstatement, where the witness follows verbal instructions from the interviewer to mentally recreate the personal and physical context that they experienced during the event. The present findings showed that this procedure is not effective for witnesses with ASD in SAI format in which the social component of its administration is removed. However, the SAI sketch plan component did elicit more correct details from the ASD group, although to a lesser degree than for the comparison group. Theoretical and practical implications of the findings are discussed.

Key words: autism spectrum disorder; memory; eyewitness; cognitive interview; self-administered interview; context reinstatement

Evaluating the effectiveness of the Self-Administered Interview© for witnesses with autism spectrum disorder

Autism spectrum disorder (ASD) is a life-long neurodevelopmental disorder that is characterised by impairments in social communication and interaction as well as restricted and repetitive behaviours (American Psychiatric Association, 2013). Being a spectrum disorder, there is wide variability in presentation of autistic characteristics and individuals with ASD may differ substantially from one another in most abilities, including in social and cognitive domains, with IQ scores ranging across the scale. The nature of the disorder puts people with ASD at increased risk of victimisation and a small minority becomes involved in offending (see King & Murphy, in press; van Roekel, Scholte & Didden, 2010) and consequently they may be questioned by the police. People with ASD tend to have poor sensory integration and attention difficulties (e.g., Occelli, Esposito, Venuti, Arduino & Zampini, 2013) as well as specific memory difficulties (see Maras & Bowler, in press), all of which are liable to impact directly or indirectly on their ability to provide evidence. It is therefore essential that we understand how best to interview persons with ASD to elicit the most detailed and accurate reports from them.

ASD is associated with a unique profile of strengths and weaknesses in attention and memory as well as atypicality in sensory and emotion processing. Consequently individuals with ASD tend to experience events very differently from most people. Whilst generally unimpaired or even gifted in some areas such as item-specific 'list' memory (Gaigg, Gardiner & Bowler, 2008), deficits in episodic memory are widely reported, although these tend to be subtle in high-functioning individuals (see Boucher, Mayes & Bigham, 2012, for an excellent review). In summary, memory findings in ASD show that *unsupported* episodic memory retrieval (i.e. free recall) is often impaired in ASD, whilst recall is comparable to neurotypical individuals when more supportive tests procedures such as cued recall are used (Bowler,

Matthews & Gardiner, 1997). These findings have led Bowler and colleagues to coin the "task support hypothesis", which proposes that the memory difficulties experienced by individuals with ASD are usually diminished if more support for retrieval is provided at test, for example with more cues to the to-be-remembered information (Bowler, Gardiner & Berthollier, 2004).

The Cognitive Interview (CI) is an interviewing tool designed to elicit more details from witnesses, based on a number of principles of memory, cognition, social dynamics and communication (Fisher & Geiselman, 1992; Geiselman et al., 1984). The two most effective components of the CI are the mental reinstatement of context and the instruction to report everything (Milne & Bull, 2002). A substantial body of research has now shown the CI to be effective in increasing correct recall with most witnesses, including older adults, across a range of witnessing conditions and time delays (see Memon, Meissner & Fraser, 2010). However, previous work has demonstrated that the CI is ineffective for witnesses with ASD: it does not increase the number of correct details they report and actually makes them less accurate relative to the general population in comparison to a structured interview format without the CI mnemonics (Maras & Bowler, 2010).

The context reinstatement procedure requires following a series of verbal instructions from the interviewer to mentally 'travel back' in time, emotion and sensory experience to the historical contextual details surrounding the event in order to trigger better memories of the actual event (Fisher & Geiselman, 1992). This procedure appears to pose a particular problem for individuals with ASD; however, subsequent research has shown that environmental context can facilitate recall in members of this group if they physically, rather than just mentally, return to it (Maras & Bowler, 2012a). There are a number of possible explanations for why the CI, and in particular mental reinstatement of context, is ineffective in its standard format for ASD witnesses. ASD is associated with impairments in emotional imagination

(Fine, Semrud-Clikeman, Butcher & Walkowiak, 2008) as well as executive function and working memory difficulties (e.g., Bennetto, Pennington & Rogers, 1996). These impairments are likely to affect the ability of witnesses with ASD to spontaneously identify and keep 'in mind' information about an event and its context whilst simultaneously following verbal instructions from an interviewer – a cognitively demanding process. Indeed, whilst deficits in spatial working memory are consistently reported in the ASD literature (e.g., Cui, Gao, Chen, Zou & Wang, 2010; Morris, Rowe, Fox, Feigenbaum, Miotto & Howlin, 1999; Steele, Minshew, Luna & Sweeney, 2007), difficulties with verbal working memory, in high functioning individuals at least, only tend to emerge when information processing demands of the task are increased (Minshew & Goldstein, 2001 and see Poirier, Martin, Gaigg & Bowler, 2011). Moreover, the "report all" instruction might actually be a hindrance for witnesses with ASD due to their difficulties in determining what is relevant when constructing a social narrative based on a past event (Losh & Capps, 2003; Loth, Gómez & Happé, 2008). Finally, it is likely that the social elements of the CI, including rapport building and the social dynamics of the interview are problematic given that the disorder is characterised by difficulties in social communication and interaction. These impairments may be particularly limiting on tasks presented in an open-ended (*"tell me everything"*) format (Ozonoff, 1995; White, Burgess & Hill, 2009).

The Self-Administered Interview© (SAI, Gabbert, Hope & Fisher, 2009) is an interviewing technique that is based on the CI's mnemonics and, as its name suggests, is self-administered by the witness (by reading instructions) rather than by an interviewer. The SAI includes several cognitive components that do not necessarily require socially interactive administration, including context reinstatement, multiple and varied retrieval methods and the instruction to "report all". The SAI was developed to elicit a detailed and accurate report as soon as possible after the event where police time and resources are strained, thus enabling a

quality retrieval attempt that minimises the decay of information in memory before further police interviews are possible (see Hope, Gabbert & Fisher, 2011). The SAI may be particularly suitable for witnesses with ASD for three reasons. First, it removes the social component of interview administration. Second the SAI provides instructions via a different sensory modality, and third it allows the witness to control the pace both at which they (self) administer the instructions and at which they recall details of the event.

The aim of the present study was to examine the effectiveness of the SAI for witnesses with 'high functioning' ASD (i.e. without co-morbid learning disability). We were interested in whether the SAI facilitated recall of an event immediately as well as whether it protected against forgetting of details after a one-week delay (Gabbert et al., 2009). Of particular interest was whether a major subsection of the SAI, written context reinstatement instructions, elicited more correct details from the ASD group compared to a control structured interview. Previous research has shown that context reinstatement, administered verbally in an interview, is ineffective in this group (Maras & Bowler, 2010; 2012a). In the SAI participants are provided with written instructions to focus and mentally travel back in time to when they witnessed the event. The instructions delivered in this non-social manner allow the witness to retrieve memories at their own pace and without the cognitive burden of simultaneous social interaction demands. If the social component and/or the requirement to process instructions via the auditory modality are factors that prevent witnesses with ASD benefitting from context reinstatement techniques then the SAI should enhance their recall. However, ASD working memory impairments and difficulties complying with instructions when accessing and selecting relevant details from memory (e.g., Goldstein, Minshew & Siegel, 1994; Minshew & Goldstein, 1998) may somewhat limit the scope of the SAI to provide the usual context reinstatement benefits. Given that difficulties in multitasking are often reported in the disorder (e.g., Hill & Bird, 2006; Mackinlay, Charman & Karmiloff-

Smith, 2006), these demands may be particularly problematic when made in combination with one another. We predicted, therefore, that the SAI would benefit ASD witnesses compared to a control structured interview (SR), but also an interaction effect with the SAI (cf. control SR) having a greater effect on the comparison participants than on ASD participants. We were also interested – both practically and theoretically - in another element of the SAI, namely the scene sketch which utilises a different sensory modality, focuses recall on specific event-related details, potentially reducing demand on working memory. In line with recent work showing that sketching to reinstate context is effective for children with ASD (Mattison, Dando & Ormerod, submitted), we predicted that the sketch plan component of the SAI would be effective in supporting ASD witnesses to recall more details.

Method

Participants

Participants with ASD (N=33; 27 males) were recruited predominantly in London and the South East of the UK from autism support groups and societies, and by word of mouth. All ASD participants had received formal diagnosis by qualified clinicians with local health authorities according to DSM-IV (American Psychiatric Association, 2000) criteria for Autistic Disorder or Asperger's syndrome, and diagnoses were confirmed for all participants by assessment with the Autism Diagnostic Observation Schedule (ADOS; Lord, Rutter, DiLavore & Risi, 1999).

Comparison participants (N=35; 26 males) were recruited through local newspaper advertisements and were pairwise matched within 7 points of verbal IQ as measured by the WAIS-R or WAIS-III UK (Wechsler, 1997) to the ASD participants. None of them had known psychiatric, developmental or neurological disorders. Groups did not significantly differ on age, VIQ, PIQ or FIQ and participants were randomly assigned to interview conditions with the constraint that all subgroups were matched in terms of chronological age

and VIQ (all group and interview condition main effects and interaction Fs < .68, ps > .41). Table 1 summarises these data.

Participants also completed the Autism Spectrum Quotient (AQ, Baron-Cohen, Wheelwright, Skinner, Martin & Clubley, 2001). None of the comparison participants exceeded the minimum cut off score for ASD of 32 (M = 15, Range = 4-28), and as expected the ASD group scored significantly higher (M = 33, Range = 21-45) than the comparison group on this measure, t (63) = 11.47, p < .001, Cohen's d = 2.87. Participants provided their informed consent and were warned before watching the video that some people may find the events in the video disturbing. Ethical approval for the study was obtained from the Research Ethics Committees at City University London and Royal Holloway, University of London.

Table 1

Age and IQ scores for the ASD and comparison groups (standard deviations in parentheses)

Condition	**ASD (*n* = 33)**	**Comparison (*n* = 35)**
Self-Administered Interview (SAI)		
Age (years)	42.72 (11.31)	43.47 (13.36)
VIQ[a]	109.94 (16.34)	111.65 (16.57)
PIQ[b]	106.17 (18.47)	105.29 (16.54)
FIQ[c]	109.11 (16.96)	109.76 (17.39)
Structured Interview (SR)		
Age (years)	41.93 (13.36)	43.28 (13.21)
VIQ[a]	112.00 (15.34)	108.67 (13.59)
PIQ[b]	109.13 (14.33)	103.56 (14.60)
FIQ[c]	111.73 (14.46)	107.00 (13.93)

a Verbal IQ; b Performance IQ; c Full-scale IQ (WAIS-R UK or WAIS-III UK)

Materials

Video. The video lasted 105 seconds and depicted an attack on a woman in a taxi cab. The video was presented on a 17" monitor in a different room from that in which participants completed their interview booklets.

Interview booklets. The Self-Administered Interview© (SAI, Gabbert et al., 2009; Hope et al., 2011) was presented in a slightly modified version of its usual booklet form and comprised five main recall sections. Prior to the first section instructions emphasised the importance of completing the booklet in sequential order and completing all sections. The first section began with context reinstatement instructions in both sentence and bullet point form. Before starting to record their memories, participants were asked to picture in their mind where they were, what they saw, what they were thinking and how they were feeling at the time. They were then instructed to write down everything that they could remember (the "report all" instruction). In the second section participants were asked to recall detailed information about the perpetrator's appearance with the option of using a body diagram for participants to add further information. The third 'sketch plan' section asked participants to generate a graphical representation of the general layout of the scene, and the fourth section asked for descriptions of any other persons who were present. Information about any vehicles that may have been present or involved in the incident was asked for in the fifth section.

The SAI also contained a sixth section, asking a series of questions about the witnessing conditions, and a seventh section providing an opportunity for participants to report any additional information about the event that they had not mentioned or been asked about previously. The rate of additional relevant information provided by participants was at floor in these final two sections, and following Gabbert et al. (2009) we focused analysis on the first five sections of the booklet only.

The SAI booklet was modified slightly for ease of interpretation in the context of the present experiment. For example, the term 'video clip' was used and points that were

irrelevant and, therefore, had the potential for confusion in the experimental situation (e.g., when sketching the scene to "include details of where you were" and "was anyone involved that you know, or who you have seen before?") were omitted.

The structured recall (SR) booklet was designed to match the number of recall attempts of the SAI (i.e., five), but without the cognitive and memory-enhancing techniques of the SAI. As with the SAI, in the first section of the SR booklet participants were asked to write down what they could remember from the video clip, but they were not given the context reinstatement instructions, nor were they explicitly instructed to report everything. In the second section, participants were asked to provide detail about the perpetrator, but were not provided with a body diagram to facilitate their recall, nor were they prompted to provide specific details such as age, gender and ethnicity. The third section of the SR asked participants to provide details of the scene of the crime, but they were not given an opportunity to produce a sketch. Participants were asked to provide details of other people in the fourth section and vehicles in the fifth section, but as with the second section they were not prompted to recall specific details.

SAI evaluation questionnaires. Participants were additionally provided with SAI evaluation questionnaires, adapted from Gawrylowicz, Memon, Scoboria, Hope and Gabbert (under review), to be completed after the SR booklet at Time 2. The questionnaires asked participants about which parts of the recall booklets were particularly easy or difficult to complete, and which (if any) parts were useful in helping them to concentrate and remember more. There were also specific questions pertaining to the effectiveness and usability of the cognitive SAI components, including the context reinstatement instructions and sketch plan.

Design

The present study employed a 2 (Group: ASD vs. comparison) x 2 (Interview Condition: SAI vs. control SR) between-participants design, with two times of recall. At

Time 1 participants completed either an SAI or an SR, and at Time 2 (one week later) all participants completed an SR (regardless of their interview condition at Time 1).

Procedure

After watching the video participants completed unrelated tasks in a different room for around 30 minutes, following which they were given either the SAI or SR interview booklet to complete. Participants were given as much time as they needed to complete the booklet. Before leaving, all participants were provided with a sealed envelope containing an SR booklet, evaluation questionnaire and debrief sheet (in separate envelopes within). They were instructed to open the envelope one week later (Time 2) and to follow the instructions enclosed and return the completed forms using the SAE provided.

Coding and preliminary analyses

Each detail that participants mentioned in their recall booklet was coded as either correct or incorrect against a coding template of the video, which contained 280 pieces of information: 77 person details; 69 action details; 53 object details, and 81 surrounding details. Recall was coded using Stein and Memon's (2006) scoring template, where each piece of information was classified as a Person (P), Action (A), Surrounding (S) or Object (O) detail. For example, the sentence "the middle-aged woman was talking to a younger woman by a 'no-smoking' sign" would be coded in the following way: middle-aged (P), woman (P), was talking (A), to a younger (P), woman (P), by a 'no-smoking' sign (S). Subjective responses, such as "the cab driver was aggressive", were not coded. Each item was only coded the first time it was mentioned (e.g., a detail mentioned in Section 1 and again in Section 2 would be coded only in Section 1). In order to examine the information gained from the SAI Sketch, the third section was additionally coded for all details reported regardless of whether participants had reported them in a previous section. This allowed a direct comparison of the effectiveness of the SAI sketch plan compared to a written recall attempt. Details provided in

the sketches of the SAI were coded in the same way as the other sections, meaning that any labels and clear drawings representing video details were coded as correct or errors[1] and attributed to the appropriate detail type.

A second independent rater, blind to the hypothesis of the study, scored 12 interview transcripts (3 in each Group x Interview Condition cell). Inter-rater reliability was satisfactory; the resulting Pearson's correlations of the two raters' scores were: $r_{correct}$ = .99, p < .0001, and r_{errors} .72, p < .01.

Time taken to complete interview booklets. There was a marginally significant main effect of group for the time taken to complete the booklets at Time 1, F (1, 64) = 3.52, p = .065, ηp^2 = .05, with the ASD group taking longer to complete their booklets (M = 40.24 mins, SD = 35.87) than the comparison group (M = 27.74 mins, SD = 13.24). There was no main effect of interview condition, F (1, 64) = .85, p = .36, ηp^2 = .01 nor a Group x Interview Condition interaction for time taken to complete booklets at Time 1, F (1, 64) = .35, p = .56, ηp^2 = .01. A similar pattern was found at Time 2, with the ASD group taking significantly longer than comparison participants to complete their booklets, (F = 4.64, p < .05). Again, neither the main effect of interview condition nor Group x Interview Condition interaction was significant at Time 2 (Fs < 1.15, ps > .29). Recall booklets at Time 2 were completed an average of 7.57 days (SD = 2.83) after Time 1, and there was no difference between groups in the length of time elapsed between recall at Time 1 and Time 2, (t = .50, p = .62).

Results

We report recall findings at Time 1 and Time 2 separately. For Time 1, we first report data overall across the whole interview booklet for total correct details and errors, and accuracy rate (i.e. correct details / correct details + errors), before exploring recall elicited

[1] Errors comprise a combination of incorrect details and confabulations, which were initially coded separately but subsequently collapsed because confabulations were almost at floor. Analyses with confabulations as a separate variable did not alter the pattern of findings in any case.

with the context reinstatement and the sketch plan segments of the SAI as compared to the written recall with the SR.

Recall at Time 1

Overall completeness and accuracy of recall. To examine the overall pattern of recall between groups and interview conditions we first carried out a 2 (Group: ASD vs. Comparison) x 2 (Interview Condition: SAI vs. SR) between-participants MANOVA with correct details, errors and accuracy rate. There was a significant multivariate effect for interview condition, Wilks' $\lambda = .81$, F (3, 62) = 4.87, $p < .005$, $\eta p^2 = .19$, and a marginal Group x Interview Condition interaction, Wilks' $\lambda = .90$, F (3, 62) = 2.42, $p = .07$, $\eta p^2 = .11$, but no multivariate main effect of group, Wilks' $\lambda = .93$, F (3, 62) = 1.47, $p = .23$, $\eta p^2 = .07$. There was no main effect of interview condition for correct details, F (1, 64) = 2.69, $p = .11$, $d = .38$, 95% CIs [-.10, .86], but there was a main effect of interview condition for errors, F (1, 64) = 14.91, $p < .001$, $d = .94$ [.43, 1.43]. Participants made more errors in the SAI (M = 7.74, SD = 4.29) than in the SR (M = 4.33, SD = 2.72). There was also a main effect of interview condition for accuracy, F (1, 64) = 5.31, $p < .05$, $d = .54$ [-1.02, -.05], which revealed a similar pattern with poorer accuracy in the SAI (M = .83, SD = .08) compared to the SR (M = .87, SD = .08). The Group x Interview Condition interaction was significant for accuracy, F (1, 64) = 5.62, $p < .05$, $\eta p^2 = .08$. The ASD group were less accurate in the SAI than the SR (t(31) = 2.92, $p < .01$, $d = 1.02$ [-1.72, -.27]) whereas the comparison group were just as accurate in the SAI as the SR (t(33) = .06, $p = .96$, $d = .02$ [-.65, .68]) (Table 2). There was a marginal Group x Interview Condition interaction for correct details, F (1, 64) = 3.53, $p = .065$, $\eta p^2 = .05$: As can be seen in Figure 1, planned follow-up comparisons revealed that the comparison group recalled significantly more correct details in the SAI than in the SR (t (33) = 2.87, $p < .01$, $d = .96$ [.24, 1.63]), whereas the ASD group did not differ in their reporting of correct details between the SAI and the SR (t(31) = .15, $p = .88$, $d = .05$ [-

.74, .63]). The Group x Interview Condition interaction for errors was not significant, F (1, 64) = 1.19, p = .28, ηp^2 = .02.

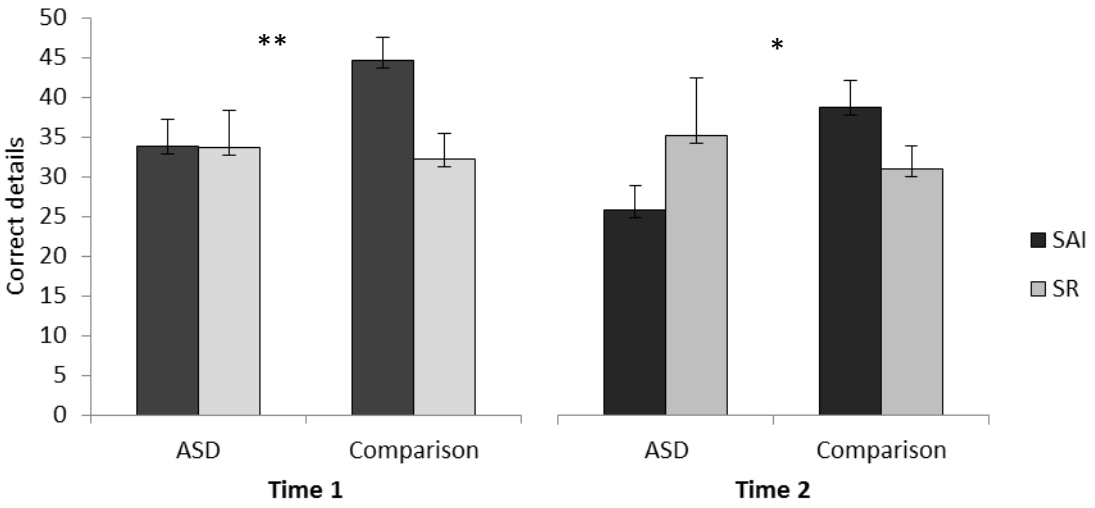

Figure 1. Total correct details recalled by participants within each group and interview condition at Time 1 (left panel) and Time 2 (right panel). Error bars reflect the standard error of the means. ** Significant Group x Interview Condition interaction, $p < .01$; * Significant Group x Interview Condition interaction, $p < .05$

Although we were interested in the difference between the complete interview conditions matched for the number of retrieval attempts to gain insight into the effectiveness of the SAI mnemonics as a whole, the practical application of such analyses are somewhat limited. The alternative police evidence-gathering procedure is a witness statement sheet asking for only a free recall attempt. Thus, in order to evaluate the effectiveness of the SAI as an investigative tool vis-à-vis the alternative in practice we conducted additional analyses to test whether the complete SAI elicited better recall than the first free recall section of the SR (as per the standard written witness statement form). A two-way MANOVA revealed a significant multivariate effect of interview condition, Wilks' λ = .63, F (3, 62) = 12.13, p < .001, ηp^2 = .37, and a Group x Interview Condition interaction, Wilks' λ = .86, F (3, 62)

= .32, $p < .05$, $\eta p^2 = .14$, but no multivariate main effect of group, Wilks' $\lambda = .92$, F (3, 62) = 1.69, p= .18, $\eta p^2 = .08$. Univariate tests revealed main effects of interview condition for correct details, F (1, 64) = 13.11, $p < .001$, $d = .85$, 95% CIs [.35, 1.34], errors, F (1, 64) = 36.19, $p < .001$, $d = 1.47$ [.92, 1.99] and accuracy rate, F (1, 64) = 11.67, $p < .001$, $d = .80$ [-1.29, -.30]. Compared to just the free recall attempt of the SR, the SAI elicited more correct details (M = 38.57 vs. 26.15) but also more errors (7.74 vs. 2.79) and an overall lower accuracy rate (.83 vs. .89). Significant Group x Interview Condition interactions also emerged for correct details, F (1, 64) = 6.25, $p < .05$, $\eta p^2 = .09$, and accuracy, F (1, 64) = 4.69, $p < .05$, $\eta p^2 = .07$.There was an important difference between the effect of an SAI on accuracy for the ASD vs. the comparison group. There was the typical SAI effect for comparison participants, with an increase in correct details (t(33) = 5.00, $p < .001$, $d = 1.68$ [.87, 2.41]) with no effect on accuracy (t(33) = 1.00, $p = .32$, $d = .34$ [-1.00, .34]). In the ASD group there was no increase in correct details (t(31) = .70, p = 4.88, $d = .25$ [-.45, .93]) and a drop in accuracy (t(31) = 3.54, $p < .001$, $d = 1.24$ [-1.95, -.46]).

Context reinstatement. The first section of the SAI provided context reinstatement instructions followed by free recall; in the first section of the SR participants were also asked for free recall but they were not given context reinstatement instructions. A 2 (Group) x 2 (Interview Condition) between-participants ANOVA revealed a main effect of interview condition for errors, F (1, 64) = 8.22, $p < .01$, $d = .81$, 95% CIs [.22, 1.20], whereby all participants regardless of group made more errors in the first section of the SAI (M = 4.63, SD = 3.04) than in the SR (M = 2.79, SD = 1.95). Nevertheless, there was not a significant main effect of interview condition for accuracy rate or for correct details reported (Fs < 2.35, ps > .13). There were also no main effects of group for correct details, errors or accuracy rate (Fs < .94, ps > .34). There was, however, a significant Group x Interview Condition interaction for correct details, F (1, 64) = 6.58, $p < .01$, $\eta p^2 = .09$, whereby the ASD group

did not differ in the number of correct details reported between interview conditions ($t(31) = .65$, $p = .52$, $d = .23$ [-.91, .46]), whereas the comparison group recalled significantly more correct details in the SAI than they did in the SR ($t(33) = 3.27$, $p < .01$, $d = 1.11$ [.37, 1.79]). These data are summarised in Table 2. The Group x Interview interactions for errors and accuracy rate were not significant (Fs < 1.05, ps > .31).

Sketch plan. In Section 3 participants were asked to provide details of the scene of the crime. The SAI asked participants to sketch the scene, whereas the corresponding section of the SR asked participants to provide a written description. A 2 (Group) by 2 (Interview Condition) ANOVA revealed a main effect of interview condition for correct details, F (1, 61) = 22.03, $p < .001$, $d = 1.08$, 95% CIs [.54, 1.58], but not for errors or accuracy rate (Fs < .83, ps > .37). The sketch plan of the SAI elicited significantly more correct details ($M = 16.24$, $SD = 9.07$) than the corresponding written SR section ($M = 8.31$, $SD = 5.04$), without a concomitant increase in errors or drop in accuracy. There was a main effect of group for accuracy, F (1, 61) = 4.13, $p < .05$, $d = .50$ [-.99, .00], and a marginal main effect of group for correct details, F (1, 61) = 3.54, $p = .065$, $d = .33$ [-.81, .16], but no difference between groups in the number of errors, F (1, 61) = .03, $p = .87$, $d = .06$ [-.43, .54]. The ASD group recalled fewer correct details and had lower accuracy rates than the comparison group. There was a significant Group x Interview Condition interaction for correct details, F (1, 61) = 4.19, $p < .05$, $\eta p^2 = .06$, but not for errors or accuracy rate (Fs < .45, ps > .51). As can be seen in Table 2, for the comparison group the sketch plan elicited more correct details than the SR ($t(33) = 3.60$, $p < 01$, $d = 1.28$ [.53, 1.98]), whereas this increase in correct details in the SAI sketch plan reporting fell short of statistical significance for the ASD group ($t(31) = 1.84$, $p = .075$, $d = .64$ [-.07, 1.33]).

Table 2

Correct details and errors reported between interviews and groups at Time 1 (standard deviations are in parentheses)

		ASD		Comparison	
		SAI	SR	SAI	SR
Overall across all interview sections	Correct	32.89 (14.35)[c]	33.73 (17.90)	44.59 (12.08)[ac]	32.22 (13.37)[a]
	Errors	8.56 (5.16)	4.20 (2.62)	6.88 (3.04)	4.44 (2.87)
	Accuracy	.80 (.08)[ac]	.88 (.08)[a]	.87 (.04)[c]	.87 (.08)
Context reinstatement	Correct	25.61 (13.51)[c]	29.07 (16.85)	37.47 (12.08)[ac]	23.72 (12.74)[a]
	Errors	4.50 (3.59)	3.13 (2.31)	4.76 (2.46)	2.50 (1.69)
	Accuracy	.85 (.11)	.90 (.08)	.89 (.04)	.89 (.09)
Sketch plan	Correct	13.11 (8.38)[b]	8.47 (5.46)[b]	17.65 (10.48)[a]	7.22 (5.05)[a]
	Errors	2.17 (2.04)	1.87 (1.92)	2.27 (2.60)	1.59 (2.06)
	Accuracy	.79 (.25)	.79 (.25)	.92 (.08)	.86 (.16)

[a] Significant within-group between-interview condition difference, $p < .01$ (qualified by significant higher order Group x Interview Condition interaction)

[b] Marginally significant within-group between-interview condition difference, $p = .075$ (qualified by significant higher order Group x Interview Condition interaction)

[c] Significant within-interview between-group difference, $p < .01$ (qualified by significant higher order Group x Interview Condition interaction)

Recall at Time 2

All participants were provided with an SR booklet to complete following a one-week delay at Time 2. Of the 68 participants who completed recall booklets at Time 1, 14 failed to

return completed booklets at Time 2[2]. A 2 (Group) x 2 (Interview Condition at Time 1) MANOVA revealed a significant multivariate Group x Condition interaction, Wilks' $\lambda = .85$, F (3, 48) = 2.82, $p < .05$, $\eta p^2 = .15$. There were no multivariate main effects for group or interview condition (Fs <2.13, ps > .12). Univariate tests revealed a significant Group x Interview Condition interaction for correct details reported, F (1, 50) = 4.43, $p < .05$, $\eta p^2 = .08$. As can be seen in Figure 1, comparison participants who had completed an SAI at Time 1 recalled more details at Time 2 than those who had completed an SR at Time 1 (t(28) = 1.80, $p = .08$, approaching significance, $d = .66$, 95% CIs [-.10, 1.37]). The ASD group, conversely, showed a trend towards recalling more correct details at Time 2 if they had received the SR rather than the SAI at Time 1, although this difference did not reach statistical significance (t(22) = 1.28, $p = .22$, $d = .52$ [-1.32, 031]). There were no Group x Interview Condition interactions for errors or accuracy rate (Fs < .36, ps > .55).

SAI evaluation questionnaires

Twenty-seven participants completed and returned their SAI evaluation questionnaire. There was no association between answers provided to any of the closed questions (i.e. 'yes' or 'no') and group for the SAI evaluation questionnaire (all ps > .16). That is, both groups provided similar categorical evaluations of the usefulness and usability of the different interview sections. For example, the majority of both ASD and comparison participants reported that the SAI booklet helped them put effort into remembering and that the context reinstatement instructions were clear. Table 3 summarises these responses.

[2] This left a final sample at Time 2 of 24 participants with ASD (13 of whom had completed the SAI, and 11 the SR, at Time 1), and 30 comparison participants (14 completed the SAI, and 16 the SR, at Time 1). Participants remained well-matched between groups and conditions on age and all IQ measures (all Fs < .20, ps > .66).

Table 3

SAI evaluation questionnaire responses by ASD and comparison participants

		% reporting 'yes'	% reporting 'no'	N
Overall SAI:				
Was the booklet more helpful	ASD	66.7	33.3	12
than a face-to-face interview?	Comparison	46.2	53.8	13
Was the SAI booklet helpful	ASD	69.2	30.8	13
for concentration?	Comparison	85.7	14.3	14
Did the booklet help you put	ASD	76.9	23.1	13
effort into remembering?	Comparison	64.3	35.7	14
Was the booklet helpful for	ASD	46.2	53.8	13
producing complete and	Comparison	46.2	53.8	13
accurate answers?				
Were the booklet instructions	ASD	100	0	13
clear?	Comparison	92.9	7.1	14
Did you think about the	ASD	66.7	33.3	12
instructions at Time 2?	Comparison	46.2	53.8	13
SAI components:				
Did context reinstatement help	ASD	61.5	38.5	13
you to remember more?	Comparison	76.9	23.1	13
Were the context reinstatement	ASD	83.3	16.7	12
instructions clear?	Comparison	92.3	7.7	13
Did you understand why you	ASD	69.2	30.8	13
were asked to do this [context	Comparison	85.7	14.3	14
reinstatement]?				
Would more information about	ASD	69.2	30.8	13
this technique have helped?	Comparison	42.9	57.1	14
Did sketching help you to	ASD	46.2	53.8	13
remember more information?	Comparison	50.0	50.0	14
Were the sketching instructions	ASD	91.7	8.3	12
clear?	Comparison	92.3	7.7	13

Discussion

The present study aimed to examine the effectiveness of the SAI for 'high functioning' witnesses with ASD. In sum, the SAI failed to elicit more correct details than a control written interview from the ASD group. This lack of effect of interview condition persisted even when comparisons were made between the complete SAI with the just the first free recall segment of the SR, as well as after a delay when participants were tested again after one week using the SR. This was in contrast to the comparison group, who recalled more correct details both immediately and also after a delay if they had initially been tested using the SAI than if they had received an SR at Time 1 (Gawrylowicz, Memon & Scoboria, 2014). These findings are consistent with previous research showing that the CI mnemonics are not effective for people with ASD in their standard form (Maras & Bowler, 2010, 2012a). The ASD group were also less accurate in the SAI compared to the SR. One could argue that the specific prompts to recall all details led to the ASD group guessing details that they were unsure of, which might be related to a more lenient response criterion in ASD or tendency towards over-compliance (North, Russell & Gudjonsson, 2008, but see Maras & Bowler, 2012b).

Of particular interest both theoretically and practically was whether witnesses with ASD would benefit from context reinstatement instructions delivered in SAI format, rather than verbally in a face-to-face interview. Despite removing the social component of the interview via self-administration using written instructions, the SAI context reinstatement instructions did not improve recall compared to a control SR interview. Difficulties in following complex linguistic instructions (Goldstein et al., 1994; Minshew & Goldstein, 1998)

and impairments in executive functions including working memory, particularly when the demands of the task are high, have previously been reported in ASD (e.g., Minshew & Goldstein, 2001). The present finding adds to the existing picture that context reinstatement instructions that do not benefit people with ASD in recalling details (Maras & Bowler, 2010, 2012a). It also indicates that it is not the social element of administration that renders the context reinstatement procedure ineffective for people with ASD. Indeed, the absence of externally imposed subject foci in the interview by the interviewer could, arguably, have exacerbated difficulties in maintaining attention on the task. ASD working memory, retrospective and prospective emotional imagination and linguistic processing difficulties may make following the context instructions whilst simultaneously retrieving memory for context before recalling their memory for details of the event particularly difficult for them. Moreover, Williams, Bowler and Jarrold (2012) recently reported that, unlike typical individuals, the imposition of articulatory suppression did not affect ASD performance on a planning task. Thus, if language and cognition operate somewhat separately (rather than as an integrated system) in ASD and not all verbal aids to memory help their recall, people with ASD may need different cues to assist their recall, perhaps physical prompts.

Future research is needed to develop more supportive procedures for mentally reinstating context with witnesses with ASD, starting with teasing apart the elements of context reinstatement to identify which, if any are useful. It may be that some parts of the context reinstatement procedure are useful for people with ASD, but are counteracted in the presence of other components that they find difficult. For example, asking participants to picture in their mind where they were and what they saw may have implications of atypical sensory and perceptual processing in the disorder, and instructing witnesses with ASD to remember what they were thinking and how they were feeling is likely to be compromised by emotional imagination difficulties (Fine et al., 2008). It appears that delivering these

instructions in the SAI format did not alleviate any difficulties caused by the reduced influence of emotion on memory in ASD (e.g., Deruelle, Hubert, Santos & Wicker, 2008; Gaigg & Bowler, 2008, 2009, but see Maras, Gaigg & Bowler, 2012). Further work is also needed to identify potential benefits of externally imposed subject foci that might act as scaffolding and, therefore, be supportive.

Although the SAI failed to elicit more correct details from the ASD group overall or in the initial context reinstatement phase, the sketch plan section of the SAI did, to a certain degree, elicit more correct details than the corresponding section of the SAI than asked for written descriptions of scene details, but with no concomitant increase in error reporting or reduction in accuracy. This finding has important practical implications for the use of sketching in investigative interviewing. The present findings indicate that participants found it easier to provide details pertaining to this event in drawings, which may have alleviated demands on working memory whilst provided self-generated physical prompts to event-related information, which may even extend to supporting the reinstatement of context. Recent research has demonstrated that 'articulated sketching' in order to reinstate context is effective in assisting children with ASD to recall more details (Mattison, Dando & Ormerod, submitted). Thus, a technique that facilitates self-prompts in the construction of social narratives, such as the sort of sketching to reinstate context utilised by Mattison et al., may assist in eliciting more details from witnesses with ASD. Nevertheless, it is important to note that the sketch plan benefitted ASD participants to a lesser degree than it did the comparison group. Future work should extend the use of the drawings, for example exploring how drawing protocols can be developed to provide additional support for ASD difficulties with attention (Narzisi, Muratori, Calderoni, Fabbro & Urgesi, 2013) spatial working memory (Williams, Goldstein & Minshew, 2005) sensory integration (Iarocci & McDonald, 2006) and multitasking (Hill & Bird, 2006). Similarly the sketch might prove useful during the

summarising stage of the interview process. In the present study the ASD group took significantly longer to complete their recall booklets, which indicates that these factors may be affecting task their performance.

There were limitations to the present study. First, the video clip was relatively brief in comparison with many criminal acts and this may limit the negative effects of attention and perception difficulties, thereby not providing an entirely representative task. Witnessing an event on-screen may produce different results than witnessing an event naturally. Second, the environmental prompts were not related to the criminal scene itself but to the video viewing. Third, coding in the present study followed the standard template used in eyewitness research (see, e.g., Memon et al., 2010). However, people with ASD are reported to show enhanced perceptual processing (Mottron, Dawson, Soulieres, Hubert & Burack, 2006), and may in fact show better more detailed recall of certain types of details than people without ASD. It is therefore important for future research to draw upon coding templates that are capable of capturing potential positive as well as negative aspects of high functioning ASD.

To conclude, findings from the present study support previous work showing that people with ASD do not benefit from verbal context reinstatement instructions. Together these findings indicate that more specific or alternative task support that takes into account the specific difficulties with language and cognition in the disorder is needed to enhance recall in people with ASD.

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